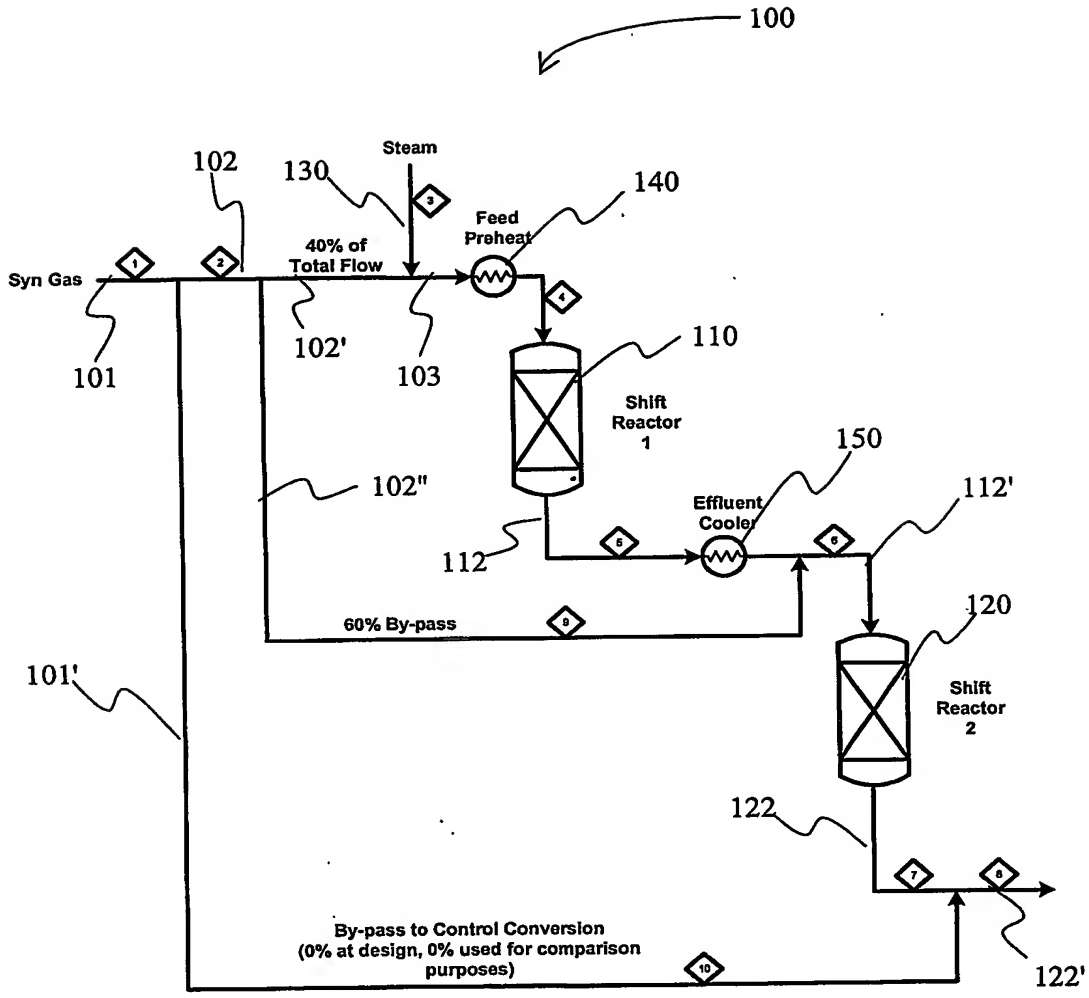
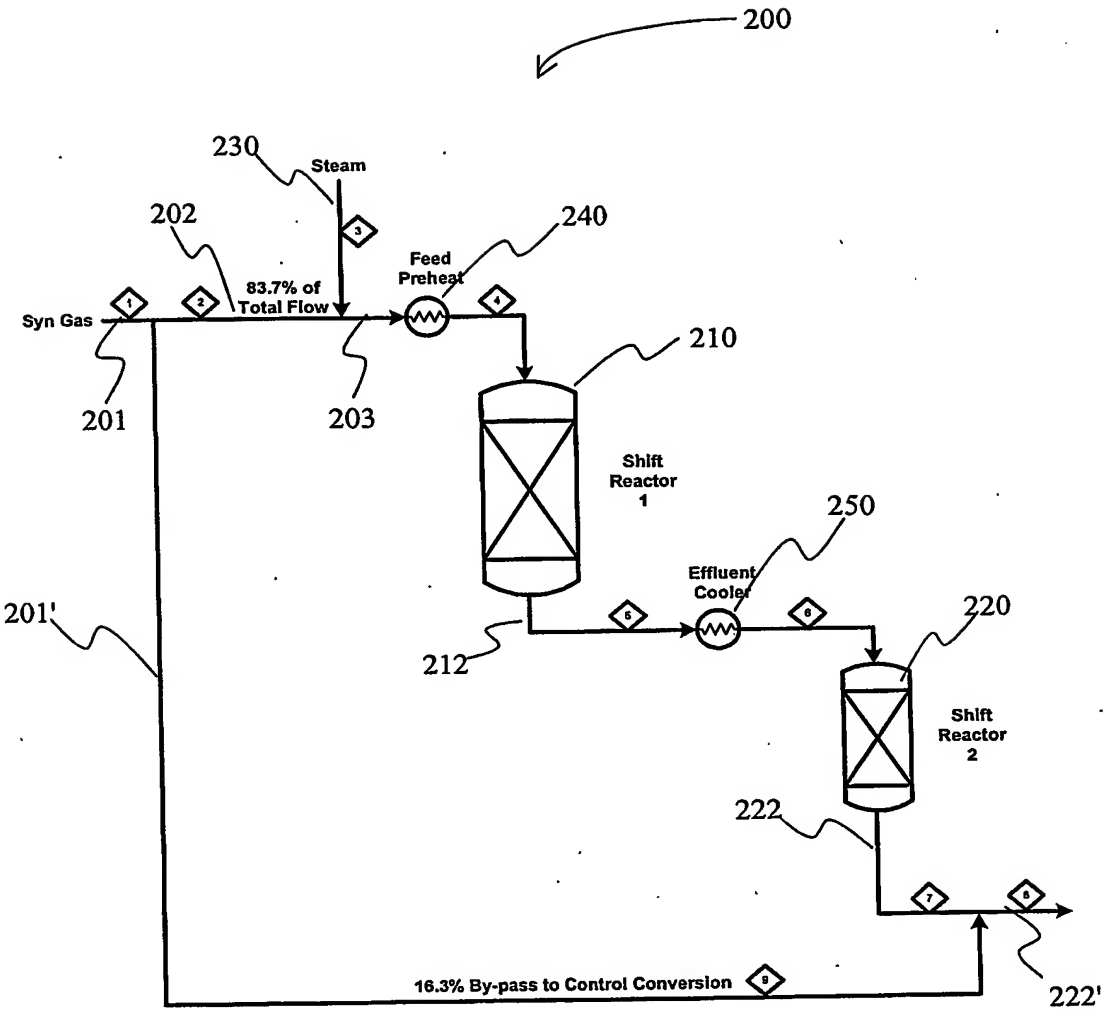

100
102
130
Steam
140
Feed Preheat
40% of Total Flow
Syn Gas
101
102'
103
110
Shift Reactor 1
150
102"
Effluent Cooler
112'
112
60% By-pass
120
101'
Shift Reactor 2
122
By-pass to Control Conversion (0% at design, 0% used for comparison purposes)
122'

Figure 1



Prior Art Figure 2

Stream #	1	2	3	4	5	6	7	8	9	10
Mole flow, lbmole/hr										
CO	22174	22174	0	8869	742	14046	3986	3986	13304	0
H2	11191	11191	0	4476	12604	19319	29378	29378	6715	0
CO2	554	554	0	222	8360	8693	18767	18767	333	0
CH4	13	13	0	5	5	13	13	13	8	0
AR	288	288	0	115	115	288	288	288	173	0
N2	2755	2755	0	1102	1102	2755	2755	2755	1653	0
O2	0	0	0	0	0	0	0	0	0	0
NH3	9	9	0	4	4	9	9	9	5	0
H2S	244	244	0	98	108	254	269	269	146	0
COS	27	27	0	11	0	16	1	1	16	0
H2O	7097	7097	30752	33591	25452	29710	19636	19636	4258	0
Total Flow lbmol/hr	44352	44352	30752	48492	48492	75103	75103	75103	26611	0
Total Flow lb/hr	894864	894864	554003	911949	911949	1448867	1448867	1448867	536918	0
Total Flow cuft/hr	649591	649591	545324	878846	1207737	1461817	1888994	1888994	389754	0
Temperature F	320	320	700	550	850	550	802	802	320	
Pressure psi	575	575	650	572	562	552	542	542	575	
Vapor Frac	1	1	1	1	1	1	1	1	1	

Figure 3

Stream #	1	2	3	4	5	6	7	8	9
Mole flow, lbmol/hr									
CO	22174	18561	0	18561	1537	1537	374	3986	3612
H2	11191	9368	0	9368	26392	26392	27556	29379	1823
CO2	554	464	0	464	17510	17510	18674	18764	90
CH4	13	11	0	11	11	11	11	13	2
AR	288	241	0	241	241	241	241	288	47
N2	2755	2306	0	2306	2306	2306	2306	2755	449
O2	0	0	0	0	0	0	0	0	0
NH3	9	7	0	7	7	7	7	9	1
H2S	244	204	0	204	226	226	226	266	40
COS	27	22	0	22	0	0	0	4	4
H2O	7097	5941	64727	70668	53622	53622	52458	53614	1156
Total Flow lbmol/hr	44352	37126	64727	101853	101853	101853	101853	109079	7226
Total Flow lb/hr	894873	749087	1166070	1915157	1915157	1915157	1915157	2060943	145786
Total Flow cuft/hr	649597	543769	1147801	1845570	2534548	1947308	2030718	2147774	105828
Temperature F	320	320	700	550	849	550	570	556	320
Pressure psi	575	575	650	572	562	552	542	542	575
Vapor Frac	1	1	1	1	1	1	1	1	1

Figure 4

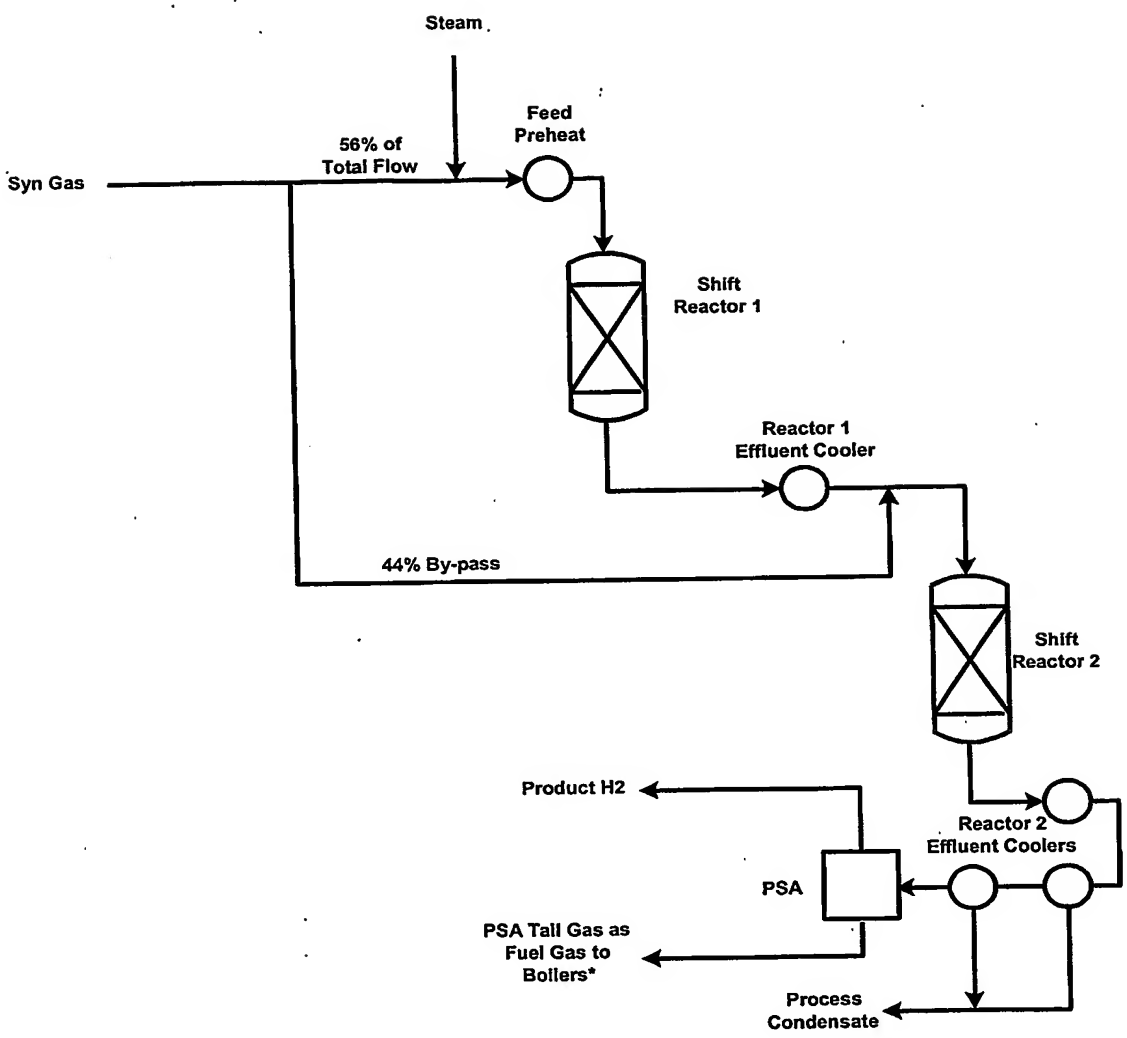

Steam
Feed
Preheat
56% of
Total Flow
Syn Gas
Shift
Reactor 1
Reactor 1
Effluent Cooler
44% By-pass
Shift
Reactor 2
Product H2
Reactor 2
Effluent Coolers
PSA
PSA Tail Gas as
Fuel Gas to
Boilers*
Process
Condensate

Figure 5

	Known Configuration (Case 1)		Inventive Configuration (Case 2)	
Stage	First	Second	First	Second
Catalyst	G-3C	G-3C	G-3C	G-3C
Size & Form	6x6 mm Tabs	6x6 mm Tabs	6x6 mm Tabs	6x6 mm Tabs
Rec. Volume, ft^3	4368.8	6545.0	2451.9	2758.2
Exit CO, lb mols/hr	1624.1	586.5	911.5	3017.4
Operating Temps., °F				
Inlet	637.5	662.5	637.5	662.5
Outlet	934.8	687.5	934.8	849.6
Vessel ID, ft.	23	25	18	19
Est. Pressure Drop, psi	5.54	5.38	4.3	6.46
Est. Catalyst Life, years	3-4	5-6	3-4	4-5

Figure 6

HIGH SHIFT CONVERTER MATERIAL BALANCES

Case 1 - First Stage

	INLET		OUTLET	
Gas Temp. °F	637.50		934.80	
Pressure Psig	353.00		347.46	
COMPOSITION	LbMoles/hr	Mole %	LbMoles/hr	Mole %
CH4	1623.600	6.840	1623.600	4.483
CO	14104.800	59.419	1624.045	4.484
CO2	2050.900	8.640	14531.655	40.122
H2	5746.800	24.209	18227.556	50.326
N2	206.500	0.870	206.500	0.570
AR	5.300	0.022	5.300	0.015
DRY TOTAL	23737.900	100.000	36218.655	100.000
	S/G ratio		S/G ratio	
H2O	51883.800	2.1857	39403.045	1.0879
WET TOTAL	75621.700		75621.700	

CATALYST:

100% G-3C 6 x 6 mm Tabs	
CATALYST VOLUME	4368.8 Ft3
DRY GAS INLET SPACE VELOCITY	2062.0 SCFH/Ft3
OUTLET EQUILIBRIUM CO	3.866 %
DEW POINT TEMPERATURE	401.7 Deg.F
BED HEIGHT	10.5 FEET
PRESSURE DROP	5.54 Psi

Figure 7A

HIGH SHIFT CONVERTER MATERIAL BALANCES

Case 1 - Second Stage

	INLET		OUTLET	
Gas Temp. °F	662.50		687.47	
Pressure Psig	343.00		337.62	
COMPOSITION	LbMoles/hr	Mole %	LbMoles/hr	Mole %
CH4	1623.610	4.483	1623.610	4.358
CO	1624.044	4.484	586.414	1.574
CO2	14531.647	40.122	15569.292	41.790
H2	18227.543	50.326	19265.192	51.710
N2	206.483	0.570	206.483	0.554
AR	5.288	0.015	5.288	0.014
DRY TOTAL	36218.650	100.000	37256.278	100.000
	S/G ratio		S/G ratio	
H2O	39402.269	1.0879	38364.639	1.0297
WET TOTAL	75620.919		75620.919	

CATALYST:

100% G-3C 6 x 6 mm Tabs		
CATALYST VOLUME	6545.0	Ft3
DRY GAS INLET SPACE VELOCITY	2100.1	SCFH/Ft3
OUTLET EQUILIBRIUM CO	1.192	%
DEW POINT TEMPERATURE	375.9	Deg.F
BED HEIGHT	13.3	FEET
PRESSURE DROP	5.38	Psi

Figure 7B

HIGH SHIFT CONVERTER MATERIAL BALANCES

Case 2 - First Stage

	INLET		OUTLET	
Gas Temp. °F	637.50		934.80	
Pressure Psig	353.00		348.70	
COMPOSITION	LbMoles/hr	Mole %	LbMoles/hr	Mole %
CH4	911.200	6.840	911.200	4.483
CO	7916.000	59.419	911.460	4.484
CO2	1151.000	8.640	8155.540	40.122
H2	3225.300	24.210	10229.840	50.327
N2	115.900	0.870	115.900	0.570
AR	3.000	0.023	3.000	0.015
DRY TOTAL	13322.400	100.000	20326.940	100.000
	S/G ratio		S/G ratio	
H2O	29118.500	2.1857	22113.960	1.0879
WET TOTAL	42440.900		42440.900	

CATALYST:

100% G-3C 6 x 6 mm Tabs		
CATALYST VOLUME	2451.9	Ft3
DRY GAS INLET SPACE VELOCITY	2062.0	SCFH/Ft3
OUTLET EQUILIBRIUM CO	3.866	%
DEW POINT TEMPERATURE	401.7	Deg.F
BED HEIGHT	9.6	FEET
PRESSURE DROP	4.30	Psi

Figure 7C

HIGH SHIFT CONVERTER MATERIAL BALANCES
Case 2 - Second Stage

	INLET		OUTLET	
Gas Temp. °F	662.50		849.58	
Pressure Psig	343.00		336.54	
COMPOSITION	LbMoles/hr	Mole %	LbMoles/hr	Mole %
CH4	1822.500	5.416	1822.500	4.619
CO	8827.400	26.234	3017.405	7.647
CO2	9306.600	27.658	15116.595	38.309
H2	13455.000	39.986	19264.995	48.823
N2	231.800	0.689	231.800	0.587
AR	5.900	0.018	5.900	0.015
DRY TOTAL	33649.200	100.000	39459.195	100.000
	S/G ratio		S/G ratio	
H2O	22143.300	0.6581	16333.305	0.4139
WET TOTAL	55792.500		55792.500	

CATALYST:

100% G-3C 6 x 6 mm Tabs	
CATALYST VOLUME	2758.2 Ft3
DRY GAS INLET SPACE VELOCITY	4629.8 SCFH/Ft3
OUTLET EQUILIBRIUM CO	6.673 %
DEW POINT TEMPERATURE	354.1 Deg.F
BED HEIGHT	9.7 FEET
PRESSURE DROP	6.46 Psi

Figure 7D